Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 11(4): 1701, 29 July 2015 doi: http://dx.doi.org/10.15560/11.4.1701
ISSN 1809-127X © 2015 Check List and Authors

New records of *Cyathea atrovirens* (Langsd. & Fisch.) Domin (Cyatheaceae) from Argentina

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Abstract: *Cyathea atrovirens* (Cyatheaceae) is the southernmost tree-fern of Argentina and its presence in the Corrientes province was in doubt after the height of the Yacyretá dam was raised. However, new records confirm the presence of the species in the province and increase the range distribution southward. Comments on the distribution and ecology of the species are now reported.

Key words: tree-fern, distribution, North-eastern Argentina

About 500 species of the Cyatheaceae family exist in the world (Korall et al. 2006). Only five species are present in Argentina; the distribution of the family is restricted to the north of the country in the Misiones and Salta provinces, where important populations exist. Also there is only one recorded in Jujuy province and three in Corrientes. In Argentina, the genus *Cyathea* is represented by two species, distributed in the northeast: *Cyathea delgadii* Sternb. and *Cyathea atrovirens* (Langsd. & Fisch.) Domin (Marquez 2010).

Recent studies have reported the presence of *C. atrovirens* in the southern margins of the reservoir of the Yacyretá hydroelectric dam on the Parana River in the province of Corrientes (Marquez et al. 2006; Fontana et al. 2007). However, in 2011, the reservoir increased to its maximum level of 82.88 m and caused the disappearance of populations growing on Rincón Ombú and Garape, in the Department of Ituzaingó, which were submerged under water (Ernesto Krauczuk, pers. obs.). Thus, the disappearance of the populations in the Corrientes province was considerable.

During field recognitions of flora made in that province in recent years, new discoveries of this species were made in the Predio Forestal Olivari (Villa Olivari) and in the Predio Forestal Puerto Valle, both properties of Pomera Maderas in the Department of Ituzaingó. New specimens were also found at Virocay farm (Municipality of Gobernador Valentín Virasoro) and at the La Blanca farm (Municipality of Santo Tomé), both in Department Santo Tomé (Figure 1).

The populations found in Villa Olivari grow in the south of Ituzaingó City on the paleobed of the Parana River (Figure 2), in the ecotone of a palm grove of *Butia paraguayensis* (Barb. Rodr.) L.H. Bailey. They can also grow under trees species of *Erythrina crista-galli* L.

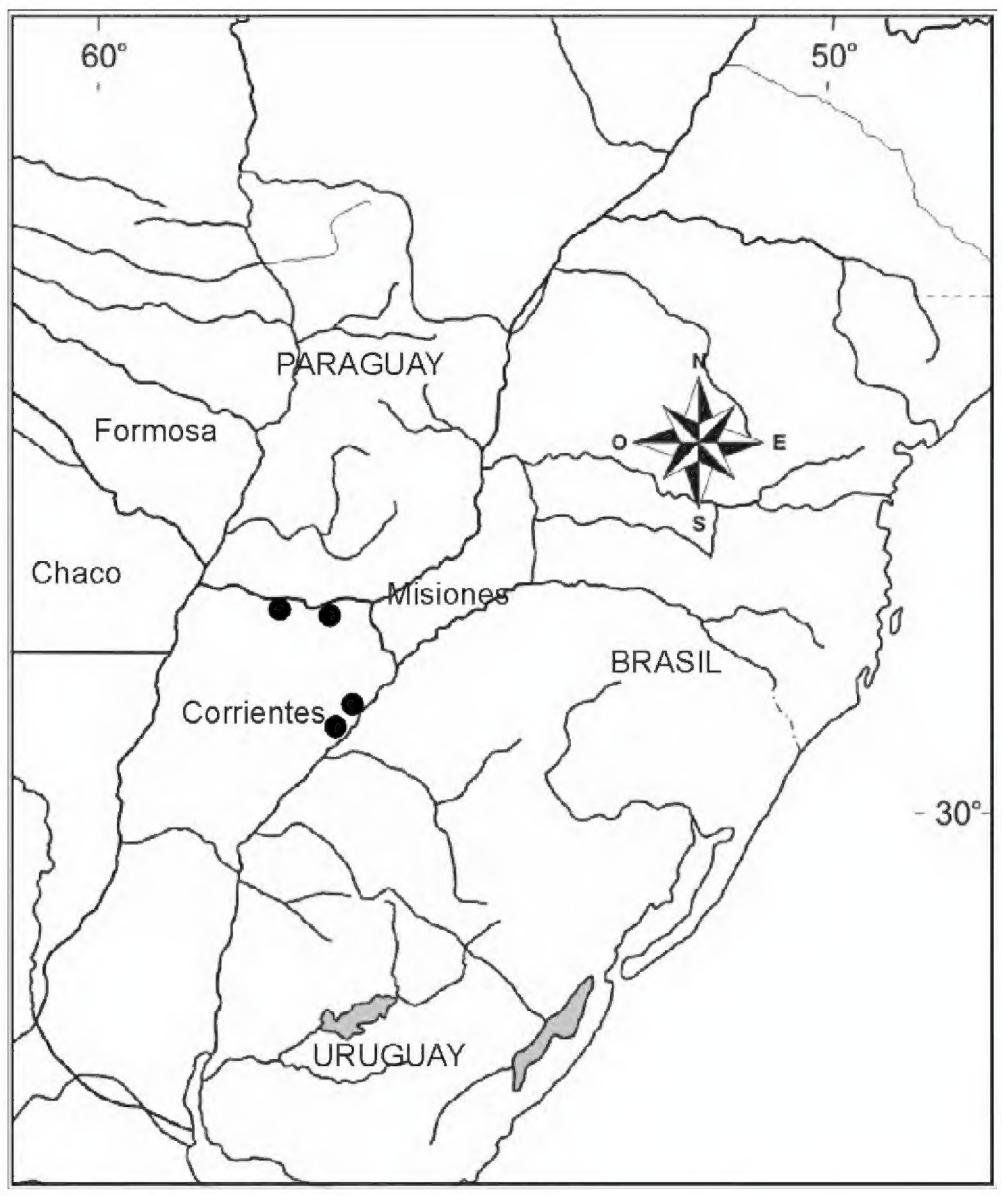

Figure 1. Distribution of *Cyathea atrovirens* (•) in Corrientes province, Argentina.

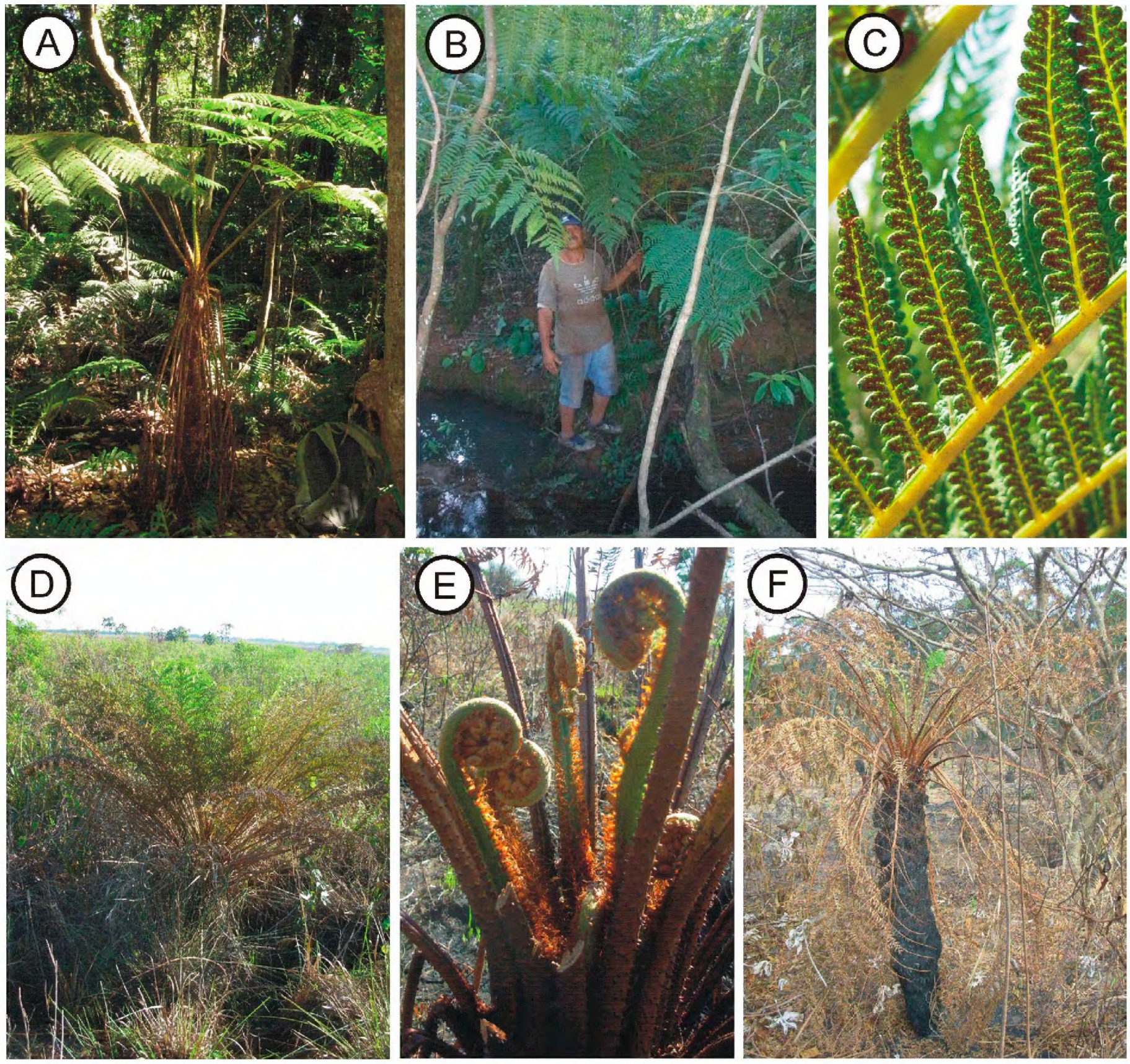

Figure 2. A: sample of *Cyathea atrovirens*, growing in a forest of ararí from Villa Olivari. **B**: individuals found in a gully in La Blanca farm, Santo Tomé. **C**: detail of the leaf, where it shown pinnes with a lot of sporangia on the single veins. **D**: saplings of this species are growing in the field of Villa Olivari. **E**: detail of young leaf. **F**: adult specimen sprouting after surviving a fire.

(Fabaceae), *Inga affinis* DC. (Fabaceae), *Croton urucurana* Baill. (Euphorbiaceae), or *Miconia chamissois* Naudin (Melastomataceae), among other. These ferns are exposed to sunlight and they form groups of 3–6 individuals, which reach maximum heights that do not exceed 1.5 m.

In Puerto Valle, the populations grow under areas of forest of "ararí", *Calophyllum brasiliense* Cambess. (Calophyllaceae), northeast of the Iberá wetlands (Figure 2). In several of these small forests up to 10 individuals of the species were detected and also three saplings were located in the wetland, near groves of the *Butia paraguayensis* palm, along the sandy margins of paleobed.

Individuals were located in Santo Tomé growing in a gallery forest of a small stream, which runs into a gully (Daniel Ligier pers. obs.) (Figure 2). In that place, native species of both grasses and trees are abundant, especially *Chusquea ramosissima* Lindm. (Poaceae), *Guadua* aff. *trinii* (Poaceae), *Myrsine parvula* (Mez) Otegui (Myrsinaceae), *Syagrus romanzoffiana* (Cham.) Glassman (Arecaceae), *Ficus* sp. (Moraceae), and *Piper regnelli* (Miq.) C. DC. (Piperaceae), among others. These remnants of a native forest are located on Virocay and La Blanca farms, both surrounded by fields, and in the second instance, near the Uruguay River, in front of San Mateo Island.

The aims of this communication are to confirm the presence of *C. atrovirens* in Corrientes province and to expand its south distribution in Argentina to 28°27′39.22″ S (WGS 84), about 100 km from previously known records.

***Cyathea atrovirens* (Langsd. & Fisch.) Domin**, Pteridophyta 262. 1929. *Polypodium atrovirens* Langsd. & Fisch., Icon. Filic. 12, t 14. 1810. *Typus*: Brasil, Ilha de Santa Catarina, Langsdorff (*holotypus* LE!; *isotypus* BM).

Description and figures: see Marquez 2010, 177. Also see Figure 2.

DISTRIBUTION: Northeastern Argentina, southern Brazil, eastern Paraguay and northern Uruguay.

SPECIMENS EXAMINED: ARGENTINA. CORRIENTES. Department of Ituzaingó: Villa Olivari, Predio Forestal Olivari, Empresa Pomera, 1 March 2013, *Krauczuk & Keller 91* (CTES, LP); *idem*, *Krauczuk & Keller 92* (CTES, LP); *idem*, Puerto Valle, Esteros del Iberá, Empresa Pomera, 2 March 2013, *Krauczuk & Keller 99* (CTES, LP); *idem*, *Krauczuk & Keller 100* (CTES, LP). Department of Santo Tomé: estancia La Blanca, 28°27′39.22″ S, 055°57′05.10″ W, 27 May 2012, *Krauczuk 46* (MNES, LP); *idem*, *Krauczuk 47* (MNES, LP); *idem*, *Krauczuk 48* (MNES, LP); *idem*, *Krauczuk 53* (MNES, LP); *idem*, *Krauczuk 54* (MNES, LP); *idem*, *Krauczuk 55* (MNES, LP); *idem*, Estancia Virocay, 17 April 2014, *Krauczuk 256* (LP).

The presence of *Cyathea atrovirens* at different places of Corrientes province is evidence of the good state of preservation of these forested areas and may provide important information about the pristine distribution of Cyatheaceae in the southern South America.

Although this species is widely distributed in southern Brazil, eastern Paraguay and the Misiones province of Argentina, these populations are usually exploited for commercial uses, such as brackets of orchids and bromeliads. For this reason *C. atrovirens* has been included in the appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora – CITES (Inskipp and Gillet 2003), which encompasses "... species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled". Nowadays, the species has been protected in Misiones province and its conservation is a priority in Argentina.

The Cyatheaceae family depends on the environment where they grow (Perez Paredes 2013), therefore the presence of *C. atrovirens* in this province is very important to conservation. If we consider that the ferns are good ecological indicators, especially in relation to the succession and the degree of adaptation to particular environmental conditions, such as soil, moisture and cover, they can be used as good indicators for the conservation of protected areas.

Also the data in the present paper provides new information about the theory of an ancient connection between the Parana and Uruguay rivers, which disappeared during the Quaternary period of the Cenozoic Era (Orfeo 2005; Popolizio 2006). In this sense, geographical and environmental changes during the Holocene produced the retraction of the forest in the Corrientes province and confined them to the edges of the rivers and the highlands on the Iberá Wetlands.

ACKNOWLEDGEMENTS

We thank Diego Kowalyczyn, Sebastián Robbiani of Pomera Maderas, Patricia Heynes of Virocay farm, as well as John and Patricia Field of La Blanca farm, for allowing us to work on their farms. We especially thank Alejandro Franzoy for his collaboration in the field work and for informing us of the existence of tree-ferns in Santo Tome. Patricia Heynes, Sebastian Navajas, Vladimir, Yulca Krauczuk, and to Graciela Correa, for collaborated in the field work. Suzanne Allen helped with the English language.

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Authors' contribution statement: EC and EK collected the specimens, EC, GM and EK identified the specimens, GM wrote the text, and EC and GM made the analysis.

Received: 9 August 2014
Accepted: 9 June 2015
Academic editor: Mateus Paciência